

*This application is a divisional of 10/076,984,
filed on 2/15/02, now US 6,686,432.*

ALTERNATING COPOLYMERS OF ISOBUTYLENE TYPE MONOMERS

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates generally to copolymers of vinyl monomers. More specifically, the present invention is directed to copolymers containing isobutylene type monomers and their use as flow control agents in thermosetting coating compositions.

2. Description of Related Art

[0002] It is often observed that monomers that do not readily homopolymerize are able to undergo rapid copolymerization reactions with each other. The most typical situation occurs when a strong electron donating monomer is mixed with a strong electron accepting monomer from which a regular alternating copolymer results after free radical initiation. Maleic anhydride is a widely used example of a strong electron accepting monomer. Styrene and vinyl ethers are typical examples of an electron donating monomer. Systems, such as maleic anhydride - styrene, are known to form charge transfer complexes, which tend to place the monomers in an alternating sequence prior to initiation. The application of the free radical initiator "ties" the ordered monomers together to form an alternating copolymer (Cowie, Alternating Copolymers, Plenum, New York (1985)).

[0003] U.S. Patent Nos. 2,378,629 to Hanford and 4,151,336 to Sackmann et al. disclose that even when a moderately electron donating monomer, such as diisobutylene, is copolymerized with a strong electron acceptor monomer, such as maleic anhydride, an alternating copolymer results.

[0004] When a moderately electron donating monomer, such as isobutylene, is copolymerized with a moderately electron accepting monomer, such as an acrylic ester, poor incorporation of the electron donating monomer results. For example, free radical copolymerization of isobutylene (IB) and